

PROTECTING WETLANDS FOR THE FUTURE DRIVING CHANGE WITH CITIZEN DATA



POLICY & EDUCATION OUTCOMES

- Contribution to the Australian National Greenhouse Accounts
- Informed new "Blue Carbon" Emissions Reduction Fund (ERF) method
- Increased above-ground mangrove forest carbon stock assessment sites
- Informed local management
- Contributed to 2019-2020 Cairns and Far North Queensland Mangrove Condition Report Card
- 6 Cool Australia MangroveWatch Citizen Science Lesson Plans
- 5 Training Videos



This program uses the MangroveWatch methodology, developed by Dr Norm Duke and Jock Mackenzie with MangroveWatch Ltd.

SUMMARY

Protecting Wetlands for the Future is a unique program enabling Queensland students and teachers to inform Great Barrier Reef (GBR) tidal wetland protection through citizen science. Trained in the proven and highly successful MangroveWatch methodologies, students and teachers completed mangrove and saltmarsh condition assessments and biomass measurements across four GBR regions; Cairns, Mackay, North Keppel Island and Gladstone.

Data collected from the program to date has informed national 'Blue carbon' investment policy, influenced local government tidal wetland decision-making and assisted local community groups advocate for improved tidal wetland management.

CITIZEN SCIENCE EMPOWERS LOCAL MANAGEMENT

Citizen scientists have a critical role in mangrove conservation and emissions reduction. They help:

Address critical data gaps

- Collect long term data
- Increase spatial coverage & distribution of mangrove forest study sites
- Provide increased number of mangrove forest standing stock carbon assessments

Improve local management and conservation

- Improve understanding of local issues & threatening processes
- Integrate local and ecological knowledge
- Increase community awareness
- Inspire local 'mangrove champions'

WHY MANGROVES?

Mangroves and tidal wetlands occupy the dynamic interface between land and sea. This location places these habitats at extreme risk from climate change pressures such as sea level rise, increased storm frequency and severity and altered rainfall patterns.

Mangroves and tidal wetlands are critical ecosystems that support, protect, and enhance the Great Barrier Reef World Heritage Area.

THEY'RE VULNERABLE

Across Australia tidal wetlands are affected by human impacts such as:



Vehicle damage



Stock grazing



Weeds and feral animals



Pollution



Altered hydrology

BUT INCREDIBLY VALUABLE

Mangroves are critical in many industrial, ecological and cultural ways, including:



Seafood



Shoreline protection



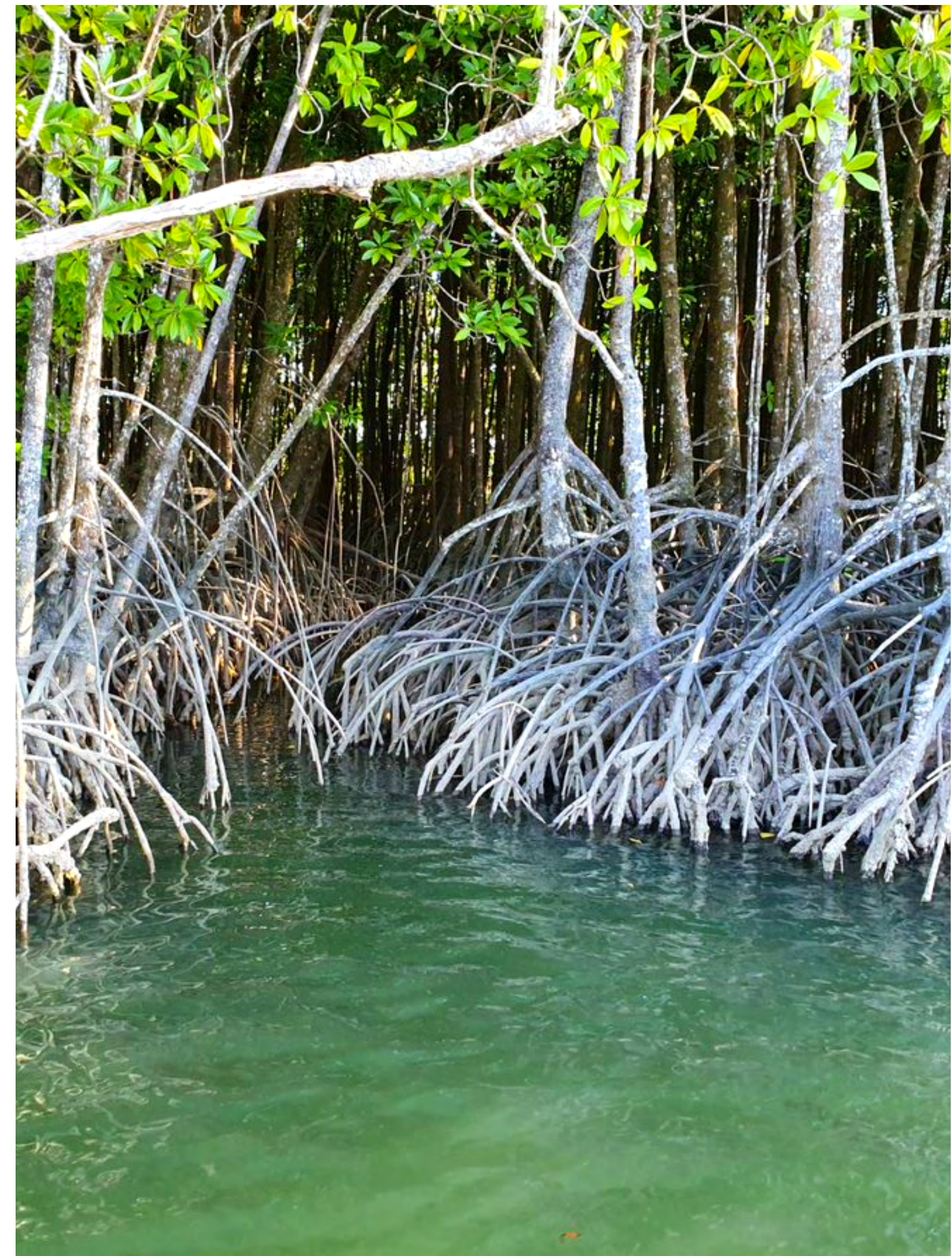
Water quality improvement



Wildlife habitat

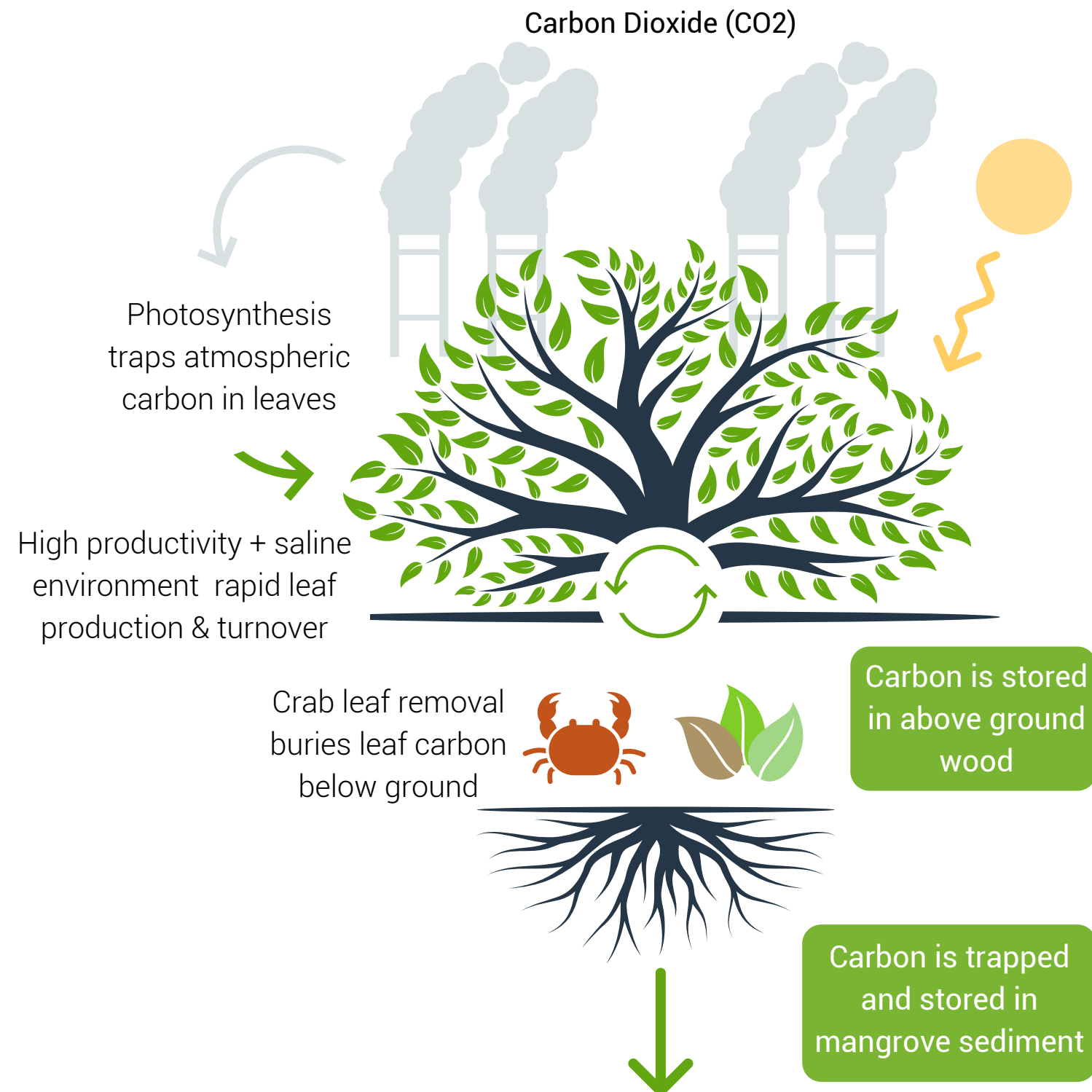


Cultural value



Most critically, mangroves are blue carbon super stores in the fight against climate change.

MANGROVES STORE 4-10X MORE CARBON AND TRAP CARBON 50X FASTER THAN OTHER FORESTS



Mangrove loss and damage releases carbon back into the atmosphere



Carbon Dioxide (CO₂) + Methane (CH₄)



Preventing mangrove loss and degradation is the most effective way to protect blue carbon stocks, enhance carbon storage & prevent carbon emissions

Despite our knowledge of the importance of mangroves and their vulnerability to climate change, mangroves and tidal wetlands are often poorly managed.

Because mangroves are highly efficient at removing carbon from the atmosphere, companies & governments can invest in 'blue carbon' ecosystem restoration as a carbon offset.

But that investment needs to be underpinned by scientific data to know exactly how much carbon can be stored and over what time period. Otherwise, it's just a whole lot of hot air. We also need to ensure that existing mangroves stay in-tact as habitat loss and degradation can result in carbon emissions.

CITIZEN SCIENTISTS BRIDGE THE GAP

Engaging people in mangrove citizen science improves local awareness of tidal wetland habitat values and threats, help to fill scientific knowledge gaps and informs local tidal wetland management strategies. These outcomes improve local mangrove and tidal wetland conservation that will help to prevent tidal wetlands from being a carbon source instead of a carbon sink.

ENGAGING AND EMPOWERING

Ensuring that existing mangroves stay in-tact is important, as habitat loss & degradation results in carbon emissions. We engaged students & teachers in data collection for this purpose.

Giving teachers the opportunity to engage students in fun 'real world' tidal wetland scientific data collection improves the student's educational experience. Students engaged in this program leave with a lasting impression of the importance of mangroves that will serve to assist building general local community environmental awareness and inspiring the next generation of future Reef managers.

We used a 3 part method to engage and empower local stewards.



Data outputs were gained through three methods



SHORELINE VIDEO ASSESSMENT METHOD



RAPID LONG PLOTS



SALTMARSH SAVERS

SHORELINE VIDEO ASSESSMENT METHOD



Method A boat-based approach for collecting whole-of-system georeferenced images of estuary shoreline habitats over time.

Engagement 6 Teacher & 59 Student engagements

Data points Location: Cairns

- 3 surveys undertaken
- 3 schools: Cairns SHS, Kuranca SC & Redlynch SC
- 32km of shoreline surveyed

Outcomes

- Data contributing to the 2019-2020 Cairns and Far North Queensland Mangrove Condition Report Card
- Future data to be used to inform the Wet Tropics Healthy Waterways Reef Report Cards
- Data contributing to local mangrove management

End User Application

Students collected shoreline video data from Thomatis Creek, a tributary of the Barron River formed part of the first mangrove condition report cards as part of the CAFNEC Cairns and Far North Queensland MangroveWatch program (also supported by the Great Barrier Reef Foundation). This data is being used in multiple ways to improve local mangrove and tidal wetland management and conservation.

Informing Reef Management: Student collected data from Thomatis Creek will be incorporated into the Wet Tropics Waterways Report Card contributing to improving Reef management.

Improving Cairns Coastal Hazard Adaptation: CAFNEC has used the report cards to prepare a submission to the Cairns Regional Council 'Our Cairns Coast' coastal hazard adaptation strategy

Advocating for change: Holloways Beach Coastcare group & Yirrganydji Traditional Owners - using the data to advocate for improved local mangrove management and rehabilitation along Thomatis Creek.

Elsewhere:

Data collected by teacher citizen scientists from the Pioneer River estuary, Mackay, has been used by Mackay Regional Council to inform and enhance a proposed shoreline wharf development in the estuary

Data collected by student citizen scientists from the Logan River is being used by Logan City Council to inform fish habitat improvement and erosion control to improve the environmental values of the Logan River.

RAPID LONG PLOTS



Method Practical and effective way to measure biomass and standing stock carbon content (carbon stored in trees) of mangrove forests.

Engagement 28 Teacher & 350 Student engagements

Data points Location: Cairns & North Keppel Island

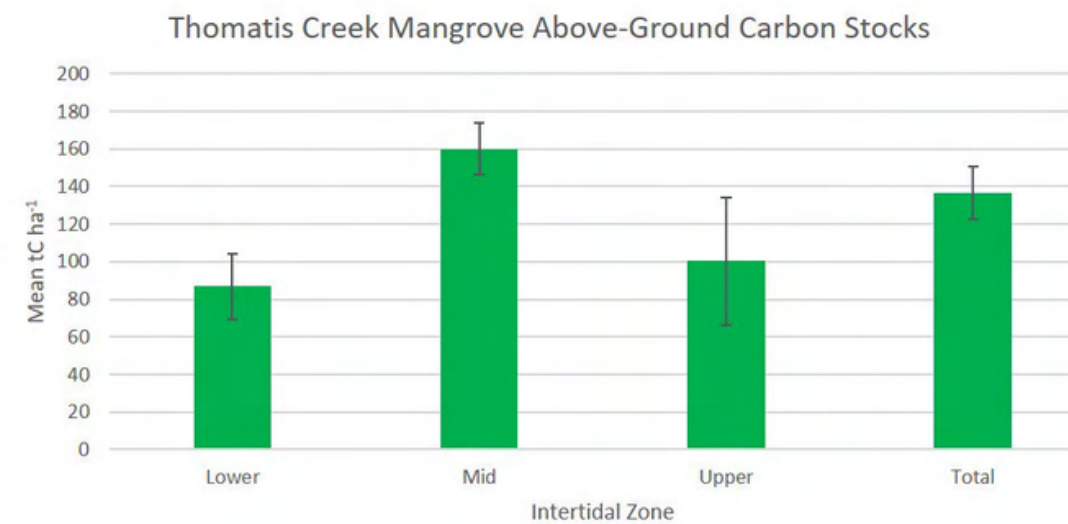
- 20 surveys submitted
- 538 trees measured
- 7.9 tonnes of carbon quantified

Outcomes

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- Development of a new "Blue Carbon" Emissions Reduction Fund (ERF) method
- Increased above-ground mangrove forest carbon stock assessment sites
- Understanding of local mangrove forest carbon stocks

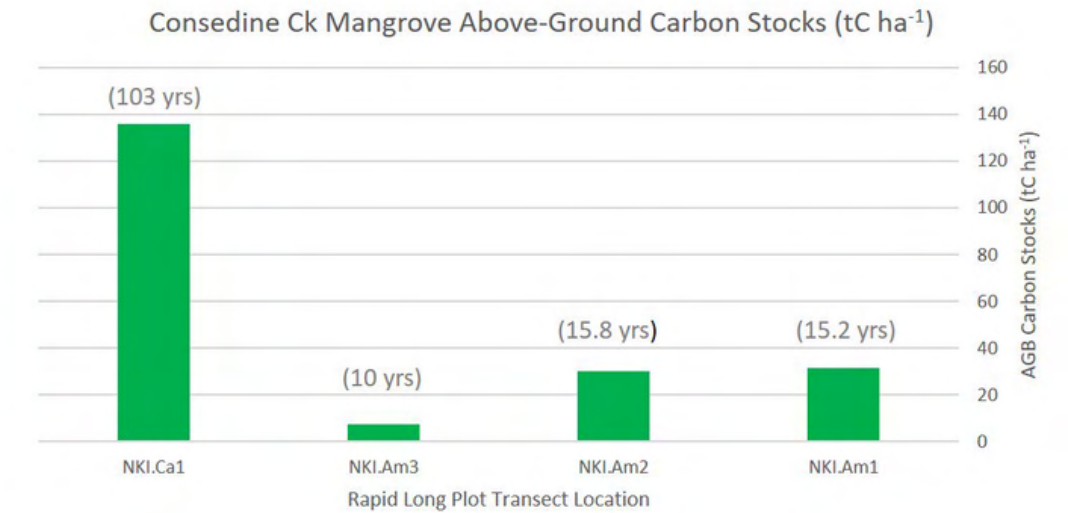
End User Application

This data has been provided to the Australian Government Department of Industry, Science, Energy & Resources to inform mangrove blue carbon modelling supporting the development of a new Blue Carbon Emissions Reduction Fund method. This new method is designed to drive investment in mangrove habitat restoration and conservation and reduce carbon emissions.



Thomatis Creek Mangrove Carbon Stock: 71,392 tC

- If these mangroves are cleared or die this would equate to the annual carbon emissions of 16,064 Australians
- Recently 0.13ha of mangroves were cleared for pipeline construction, this resulted in an estimated 65-163 t CO₂e released. Equivalent to the annual emissions of 4-10 Australians.



Consedine Creek Mangrove Carbon Stock: 273 tC

- If these mangroves are cleared or die this would equate to the annual carbon emissions of 61.6 Australians

Consedine Creek Mangrove Sequestration: 2,695 t CO₂e

- It is estimated these mangroves will remove and store the carbon emitted by 3.3 Australians every year over the next 50 years

ENHANCING COMMUNITY MANAGEMENT AND CONSERVATION

Community

- Increased community awareness
- Inspired local mangrove champions & advocates for conservation
- Local behaviour change

Science

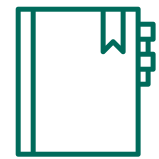
- Increasing long-term datasets
- Increased data spatial coverage
- Filling knowledge & data gaps
- Improved mangrove blue carbon modelling
- Integrated local & ecological knowledge

Management

- Improved understanding of local issues and threats
- Prioritised investment
- Informed development planning
- Improved coastal hazard adaptation

CONTINUING THE CONNECTION

To ensure long lasting impact, we developed resources that can be used by students and teachers, as well as our education delivery partners, in coming years. See lesson plans and training videos below.



LESSON PLANS



TRAINING VIDEOS

"The program is unique because not only does it fit into, and thus beautifully supports, the senior science curriculum, it allows participants the opportunity to collect meaningful data that is used to monitor and preserve mangrove areas and inform policy."

Terri Mulqueen

Holloways Beach Environmental Education Centre





RAPID LONG PLOTS

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